German Federal Institute for Risk Assessment

FAQ

18. June 2025

Trifluoroacetic acid (TFA) in wine - How does the chemical get into the glass? Is there a health risk?

According to measurements by an environmental protection organisation, commercially available wines contain residues of trifluoroacetic acid (TFA). The German Federal Institute for Risk Assessment (BfR) has prepared an initial assessment of the values found and provides answers to selected questions.

What is TFA?
Trifluoroacetic acid or trifluoroacetate (TFA) is a short-chain perfluorocarboxylic acid and is the smallest compound in the group of per- and polyfluorinated alkyl compounds (PFAS). PFAS are industrial chemicals that are used in numerous industrial processes and consumer products due to their special technical properties. TFA is very stable, persistent and long-lasting.

Where is TFA formed and how does it get into the wine?
TFA can form as a transformation product of many PFAS and can thus enter the environment as a transformation product of various pesticide active substances and fluorinated refrigerants and propellants, among other things. Due to the widespread use of PFAS and due to its persistence and high mobility, TFA is present everywhere in the environment: in water, in soil and also in plants. The BfR currently has no information on the sources of the reported concentrations of TFA in wine.

What health risks does TFA pose? Does it have a reprotoxic effect?
In sufficiently high concentrations, TFA can cause severe skin burns, eye damage and harmful effects when inhaled. In addition, the BfR assesses TFA as reprotoxic. It should be noted that this classification is purely a hazard classification. It says nothing about actual health risks, as the amount of the substance ingested is also decisive (exposure).

The reproductive toxicity effect was detected in animal models at TFA concentrations that are significantly higher than the concentrations in the environment. According to latest data, no impairments to health are to be expected if water or food contaminated with TFA is consumed.

What did the TFA measurements taken by the environmental protection organisation reveal? How reliable is the data? How does the BfR assess the published values?
The average concentration of TFA in the measured wine samples was 0.122 milligrams (mg) per litre (l), the highest value was 0.320 mg/l. The BfR does not have enough data to assess the reliability and representativeness of the measurements.

According to BfR estimates, a person with a body weight of 60 kilograms (kg) would have to drink at least 9 l of wine a day in order to exceed the health-based guidance value of TFA of 0.05 mg per kg body weight (i.e. ADI, Acceptable Daily Intake, and ARfD, Acute Reference Dose), based on the highest measured value.

Is the health risk from TFA negligible compared to the alcohol content (ethanol) in wine?
Wine contains ethanol, a neurotoxic and carcinogenic substance. Anyone who nevertheless consumes alcoholic beverages should above all replace high amounts of alcohol. This applies in particular to young people. Children, adolescents, pregnant women and breastfeeding mothers should generally avoid alcohol (https://www.dge.de/fileadmin/Bilder/wissenschaft/referenzwerte/DGEPosition_Alkohol_EU_2024_10.pdf). The German Nutrition Society (DGE) considers the regular consumption of more than 81 grams of alcohol per week to pose an increased health risk. This is roughly equivalent to the amount of alcohol contained in a bottle of wine. In relation to the 9 l of wine listed in the previous answer - which a person with a body weight of 60 kg would have to drink at least once a day to exceed the health-based guidance value of TFA - it can be assumed that the potential health risk of TFA in this scenario is negligible compared to the toxicity of alcohol.

How are consumers protected from TFA?
As part of the review of the approval of the substance flufenacet, an acceptable daily intake (ADI) of 0.05 mg per kg of body weight was derived for TFA. An acute reference dose (ARfD) was not considered necessary by the European Food Safety Authority (EFSA) as part of this procedure. In accordance with the current scientific and technical knowledge, the BfR agrees with EFSA's assessment regarding the ADI, but considers it necessary to derive an ARfD (Acute Reference Dose) as well. The ADI indicates the amount of a substance that can be ingested orally on a daily basis over a lifetime without any recognisable health risk (lifetime exposure). The ARfD, on the other hand, indicates the estimated maximum amount of a substance that can be ingested with food over the course of a day at one or more meals without recognisable health risk (one-time very high exposure). In the BfR's view, the ARfD is currently also 0.05 mg per kg of body weight. The BfR assesses TFA as reprotoxic. Responsible national and international scientific institutions and authorities are currently working on this substance on an interdisciplinary basis.

How reliable are the health-based guidance values (HBGV) for TFA?
At the request of the European Commission, EFSA is currently reviewing the health-based guidance values for TFAs. EFSA is carrying out this review together with the Member States and the European Chemicals Agency (ECHA), which is responsible for the classification of the chemical properties of TFA (https://www.efsa.europa.eu/de/topics/per-and-polyfluoroalkyl-substances-pfas). The BfR will update its assessment if new findings emerge.

Further information on the BfR website on TFA in wine

BfR communication, Trifluoroacetic acid (TFA) in wine
https://www.bfr.bund.de/en/notification/trifluoroacetic-acid-tfa-in-wine/

BfR press release, Trifluoroacetic acid (TFA): Assessment for classification in new hazard classes submitted
https://www.bfr.bund.de/en/press-release/trifluoroacetic-acid-tfa-assessment-for-classification-in-new-hazard-classes-submitted/

Questions and answers about PFAS
https://www.bfr.bund.de/en/service/frequently-asked-questions/topic/here-to-stay-per-and-polyfluoroalkyl-substances-pfas-in-food-and-in-the-environment/

About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Agriculture, Food and Regional Identity (BMLEH) in Germany. The BfR advises the Federal Government and the States ('Laender') on questions of food, chemicals and product safety. The BfR conducts independent research on topics that are closely linked to its assessment tasks.

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